

Claims

- [c1] A valve assembly for an air pressure system, comprising:
- an inlet valve including an inlet port, an outlet port and a control port, the inlet port communicating with the outlet port when the control port is above a threshold pressure;
 - a first control valve including an inlet port, an outlet port, an exhaust port, and a control member, the first control valve inlet port being in communication with the inlet valve outlet port, the first control valve outlet port communicating with one of the first control valve inlet port and the first control valve exhaust port as a function of a position of the first control valve control member;
 - and
 - a second control valve including an inlet port, an outlet port, an exhaust port, and a control member, the second control valve inlet port being in communication with the inlet valve outlet port, the second control valve outlet port communicating with one of the second control valve inlet port and the second control valve exhaust port as a function of a position of the second control valve control member.

- [c2] The valve assembly as set forth in claim 1, further including:
a double check valve including an inlet port, a locking pressure port, and an outlet port communicating with the inlet valve control port, one of the double check valve inlet port and the locking pressure port communicating with the double check valve outlet port as a function of relative air pressures at the double check valve inlet and locking ports.
- [c3] The valve assembly as set forth in claim 2, further comprising:
a proportional valve for delivering selectively pressurized air to service brakes and the double check valve inlet port, the inlet valve inlet port communicating with the inlet valve outlet port if a pressure at one of the double check valve inlet port and the locking port is above the threshold pressure.
- [c4] The valve assembly as set forth in claim 3, wherein:
the first control valve outlet port communicates with a tractor spring brake; and
the second control valve outlet port communicates with a trailer spring brake.
- [c5] The valve assembly as set forth in claim 4, wherein:
the tractor spring brake is applied when a pressure at

the first control valve outlet port is less than the threshold pressure; and
the trailer spring brake is applied when a pressure at the second control valve outlet port is less than the threshold pressure.

[c6] The valve assembly as set forth in claim 4, wherein:
the tractor spring brake is released if the pressurized air delivered to the service brakes and the control port is above the threshold pressure, for causing pressurized air at the inlet valve inlet port to be communicated to the first control valve inlet port via the inlet valve outlet port, and if the first control valve control member is positioned for communicating the pressurized air from the first control valve inlet port to the first control valve outlet port and to the tractor spring brakes; and
the trailer spring brake is released if the pressurized air delivered to the service brakes and the control port is above the threshold pressure, for causing the pressurized air at the inlet valve inlet port to be communicated to the second control valve inlet port via the inlet valve outlet port, and if the second control valve control member is positioned for communicating the pressurized air from the second control valve inlet port to the second control valve outlet port and to the trailer spring brakes.

- [c7] The valve assembly as set forth in claim 1, wherein the first control valve outlet port communicates with the locking pressure port.
- [c8] The valve assembly as set forth in claim 1 further comprising:
an exhaust conduit communicating with the first control valve exhaust port and the second control valve exhaust port.
- [c9] A braking system control for a vehicle including a service braking system and a parking braking system, the braking system control preventing the parking braking system from releasing the wheels of the vehicle unless the service braking system is engaged, the braking system control comprising:
a system pressure valve, which opens when a sensed control pressure is above a first threshold and that closes when the sensed control pressure is below a second threshold, including a system pressure valve inlet and a system pressure valve outlet, the system pressure valve directing pressurized air delivered to the system pressure valve inlet to the service braking system through the system pressure valve outlet when the system pressure valve is open and preventing pressurized air from reaching the parking braking system when the system pressure valve is closed;

a first control valve including an inlet port, an outlet port, an exhaust port, and a control member, the first control valve inlet port being in communication with the system pressure valve outlet, the first control valve outlet port communicating with one of the first control valve inlet port and the first control valve exhaust port as a function of a position of the first control valve control member; and

a second control valve including an inlet port, an outlet port, an exhaust port, and a control member, the second control valve inlet port being in communication with the system pressure valve outlet, the second control valve outlet port communicating with one of the second control valve inlet port and the second control valve exhaust port as a function of a position of the second control valve control member.

[c10] The braking system as set forth in claim 9, further including:

a latching mechanism communicating a higher one of a service braking system control pressure and a parking braking system releasing pressure as the sensed control pressure to the system pressure valve.

[c11] The braking system as set forth in claim 9, wherein:
the sensed control pressure is a higher one of a service braking system control pressure and a parking braking

system releasing pressure; and
if the sensed control pressure is below the second threshold, no pressurized air is transmitted from the system pressure valve to either the first or second control valves.

[c12] The braking system as set forth in claim 9, wherein:
the sensed control pressure is a higher one of a service braking system control pressure and a parking braking system releasing pressure; and
if the sensed control pressure is above the first threshold, pressurized air is transmitted from the system pressure valve to both the first and second control valves for enabling release of the parking braking system if the first and second control valve control members are positioned for communicating the pressurized air from the first and second control valves to the parking braking system.

[c13] The braking system as set forth in claim 12, wherein:
the first control valve communicates with a tractor parking brake; and
the second control valve communicates with a trailer parking brake.

[c14] The braking system as set forth in claim 13, wherein:
both the tractor parking brake and the trailer parking

brake are applied if the first and second control valve control members are positioned for exhausting pressurized air from the tractor and trailer parking brakes.

- [c15] A valve assembly for an air pressure system of a vehicle including a service brake, a first spring brake, and a second spring brake, comprising:
- a first control valve including an inlet port, an outlet port fluidly communicating with the first spring brake, an exhaust port, and a control member, the first control valve outlet port communicating with one of the first control valve inlet port and the first control valve exhaust port as a function of a position of the first control valve control member;
 - a second control valve including an inlet port, an outlet port fluidly communicating with the second spring brake, an exhaust port, and a control member, the second control valve inlet port being in fluid communication with the first control valve inlet port, the second control valve outlet port communicating with one of the second control valve inlet port and the second control valve exhaust port as a function of a position of the second control valve control member; and
 - means for communicating pressurized air to the first control valve inlet port and the second control valve inlet port as a function of a pressure of the service brake and

a pressure of the first spring brake.

- [c16] The valve assembly as set forth in claim 15, wherein the means for communicating includes:
an inlet valve including an inlet port, an outlet port and a control port, the inlet valve outlet port fluidly communicating with the first control valve inlet port and the second control valve inlet port, the inlet valve inlet port communicating with the inlet valve outlet port when the control port is above a threshold pressure.
- [c17] The valve assembly as set forth in claim 16, further including:
means for delivering a higher one of the pressure of the service brake and the pressure of the first spring brake to the inlet valve control port.
- [c18] The valve assembly as set forth in claim 17, wherein the means for delivering is a double check valve.
- [c19] The valve assembly as set forth in claim 17, wherein:
the pressure of the service brake is above the threshold pressure when the service brake is applied;
the pressure of the first spring brake is below the threshold pressure when the first spring brake is applied; and
the means for communicating communicates the pres-

surized air to the first and second control valve inlet ports for enabling release of the first and second spring brakes, respectively, when the pressure of at least one of the service brake and the first spring brake is above the threshold pressure.

[c20] The valve assembly as set forth in claim 15, wherein pressurized air is communicated to the first and second control valve inlet ports, for enabling release of the first and second spring brakes, respectively, when at least one of the service brake is applied above a threshold pressure and the first spring brake is released.

[c21] A method for controlling pressure to a first spring brake and a second spring brake of a vehicle via a valve system, the method comprising:
controlling an operating state of an inlet valve as a function of an operating state of a service brake and an operating state of the first spring brake;
controlling respective operating states of a first control valve and a second control valve; and
controlling the operating state of the first spring brake and an operating state of the second spring brake as a function of the operating state of the inlet valve and the respective operating states of the first and second control valves.

[c22] The method for controlling pressure to first and second spring brakes as set forth in claim 21, wherein controlling the operating state of the inlet valve includes:
fluidly communicating a higher one of a pressure of the service brake and a pressure of the first spring brake to a control port of the inlet valve; and
if the pressure communicated to the inlet valve control port is above a threshold pressure, fluidly communicating a service pressure from an inlet port of the inlet valve to an outlet port of the inlet valve.

[c23] The method for controlling pressure to first and second spring brakes as set forth in claim 21, wherein controlling the operating states of the first and second control valves includes:
selectively setting a control member of the first control valve so that an outlet port of the first control valve fluidly communicates with one of an inlet port of the first control valve and an exhaust port of the first control valve; and
selectively setting a control member of the second control valve so that an outlet port of the second control valve fluidly communicates with one of an inlet port of the second control valve and an exhaust port of the second control valve.

[c24] The method for controlling pressure to first and second spring brakes as set forth in claim 23, wherein controlling the operating state of the inlet valve includes:
if at least one of the operating state of the service brake is applied and the operating state of the first spring brake is released, controlling the operating state of the inlet valve to fluidly communicate a service pressure from an inlet port of the inlet valve to the inlet ports of the first and second control valves.

[c25] The method for controlling pressure to first and second spring brakes as set forth in claim 24, wherein controlling the operating states of the first and second spring brakes includes:
if the inlet valve is communicating the service pressure to the first and second control valves and if the control members of the first and second control valves are set so that the service pressure is fluidly communicated to the first and second control valve outlet ports, controlling the first and second spring brakes to be in a released operating state.

[c26] The method for controlling pressure to first and second spring brakes as set forth in claim 25, further including:
after the first spring brake is in the released operating state, transmitting the service pressure to the control port of the inlet valve for locking the inlet valve in the

operating state to fluidly communicate the service pressure to the inlet ports of the first and second control valves.